

Biohydrogen Production Derived from Banana Pseudo Stem of Agricultural Residues by Dark Fermentation

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Abstract : Nowadays, the demand of renewable energy in general is increasing due to the crisis of fossil fuels. Biohydrogen is an alternative fuel with zero emission derived from renewable resources such as banana pseudo stem of agricultural residues. Banana plant can be easily found in tropical and subtropical areas, so the resource is abundant and readily available as a biohydrogen substrate. Banana pseudo stem has not been utilised as a resource or substrate of biohydrogen production and it mainly contains 45-65% cellulose (α -cellulose), 5-15% hemicellulose and 20-30% Lignin, which indicates that banana pseudo stem will be renewable, sustainable and promising resource as lignocellulosic biomass. In this research, biohydrogen is derived from banana pseudo stem by dark fermentation. Dark fermentation is the most suitable approach for practical biohydrogen production from organic solid wastes. The process has several advantages including a fast reaction rate, no need of light, and a smaller footprint. 321 million metric tonnes banana pseudo stem of 428 million metric tonnes banana plantation residues in worldwide for 2013 and 22.5 million metric tonnes banana pseudo stem of 30 million metric tonnes banana plantation residues in Indonesia for 2015 will be able to generate 810.60 million tonne mol H₂ and 56.819 million tonne mol H₂, respectively. In this paper, we will show that the banana pseudo stem is the renewable, sustainable and promising resource to be utilised and to produce biohydrogen as energy generation with high yield and high contain of cellulose in comparison with the other substrates.

Keywords : banana pseudo stem, biohydrogen, dark fermentation, lignocellulosic

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